


Note		
	OBJET (Subject): VM2 vibration test Displacement of Logs	Ref : GLAST-LLR-RP-013-A
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		Annexes :
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Destinataires (To)

Pour application : P. DIZON (NRL-Swales), N. VIRMANI (NRL- Swales)

Pour information : P. PRAT (LLR), N.W. JOHNSON (NRL), P. CAROSSO (NRL-Swales), E. GROOVE (NRL)

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1. Goal

This note presents preliminary results of the vibration test of VM2 model. It focuses on the values of the displacements of the logs (dummies or CDE) that have been mounted inside the cells of the composite structure.

2. Position of accelerometers

Accelerometer has been placed on logs 1.3 and 5.6 (1 is for top layer) for X-axis vibrations and on logs 2.6 and 4.7 for Y-axis vibrations. An accelerometer has also been attached to one of the logs perpendicular to vibration axis for X and Y.

Logs 1.3 and 4.7 are CDE (VM2000 wrapping, photodiode with flex cable)

Accelerometer have been placed on the close-out plate, near the logs that were instrumented.

3. Quasi-static load

Transverse load level : -10.2 g to +10.2 g pic to pic values

The displacements have been calculated with a double integration of the difference between the input levels and the acceleration levels measured on the structure. The input levels have been measured on the interface frame that supports VM2.

Log position	Type of log	Vibration axis	Max displacement For logs	Close-out plate Displacements
Log 1.3	CDE	X axis	0.19 mm	0.14 mm
Log 5.6	Steel dummy	X axis	0.11 mm	0.16 mm
Log 2.6	CDE	Y axis	0.15 mm	0.14 mm
Log 4.7	Steel dummy	Y axis	0.09 mm	0.10 mm

- The displacements of the logs are below 0.2 mm.
- The displacements that have been measured on the close-out plates are similar to the ones measured on the logs.

From these preliminary results, the relative motion between the close-out plates and the logs is very small. The displacement of the logs are mostly related to a global motion of the structure.

4. Random vibration

The analysis of the random vibration results is more complex and the raw data need to be processed to calculate the displacements. The table below gives the RMS acceleration of the logs.

The qualification levels increased by 20% have been used for the test of VM2.

Log position	Type of log	Vibration axis	Acceleration
Log 1.3	CDE	X axis	6.76 gRMS
Log 5.6	Steel dummy	X axis	9.19 gRMS
Log 2.6	CDE	Y axis	7.76 gRMS
Log 4.7	Steel dummy	Y axis	5.48 gRMS

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The RMS acceleration of the logs are lower than the levels that have been used for quasi-static testing. The RMS displacement should therefore also be lower. Taking into account a 3σ value, the displacements under random vibrations should remain below 0.6 mm. Similar displacements are expected for the close-out plate so that the gap should be preserved.